

WHAT IS CLAIMED IS:

1. A hydraulic braking apparatus which generates a braking force to a wheel using a brake fluid pressure, which comprises:

a switching reservoir provided with a reservoir chamber which reserves the brake fluid, a reservoir port through which the brake fluid flows in and out of the reservoir chamber, and a connection port with a valve which is opened when the amount of the brake fluid which is reserved in the reservoir chamber is less than a predetermined amount and is closed when the amount of the brake fluid which is reserved in the reservoir chamber is equal to or greater than the predetermined amount and through which the brake fluid flows in and out of the reservoir chamber when the valve is in an open state;

a pump which has an intake port of which is connected to the reservoir port of the switching reservoir;

a motor which drives the pump; and

a driving apparatus that controls a duty ratio of the motor.

2. A hydraulic braking apparatus comprising:

a master cylinder which generates a master cylinder pressure by a braking operation performed by a driver;

a wheel cylinder which generates a braking force to a wheel;

a first brake conduit that connects the master cylinder and the wheel cylinder;

a pressure increase control valve which is disposed between the master cylinder and the wheel cylinder in the first brake conduit and communicates or disconnects the first brake conduit;

a switching reservoir provided with a reservoir chamber which reserves the brake fluid, a reservoir port through which the brake fluid flows in and out of the reservoir chamber, and a connection port, which is connected between the master cylinder and the increase control valve via a second brake conduit with a valve which is opened when the amount of the brake fluid which is reserved in the reservoir chamber is less than a predetermined amount and is closed when the amount of the brake fluid which is reserved in the reservoir chamber is equal to or greater than the predetermined amount and through which the brake fluid flows in and out of the reservoir chamber when the valve is in an open state;

a pressure decrease control valve which communicates and disconnects a third brake conduit that connects the wheel cylinder and the reservoir port;

a pump that sucks up the reserved brake fluid from the reservoir port, and discharges the brake fluid to the first brake conduit between the master cylinder and the pressure increase control valve;

a motor which drives the pump; and

a driving apparatus that controls a duty ratio of the motor.

3. The hydraulic braking apparatus according to claim 1, wherein the driving apparatus controls the duty ratio, in accordance with a voltage which is applied to the motor, such that the duty ratio decreases as the voltage increases.

4. The hydraulic braking apparatus according to claim 2, wherein the driving apparatus controls the duty ratio, in accordance with a voltage which is applied to the motor, such that the duty ratio decreases as the voltage increases.

5. The hydraulic braking apparatus according to claim 1, wherein the driving apparatus controls the duty ratio, in accordance with a brake fluid pressure which acts on a discharge port of the pump, such that the duty ratio increases as the brake fluid pressure increases.

6. The hydraulic braking apparatus according to claim 2, wherein the driving apparatus controls the duty ratio, in accordance with a brake fluid pressure which acts on a discharge port of the pump, such that the duty ratio increases as the brake fluid pressure increases.

7. The hydraulic braking apparatus according to claim 2, wherein the driving apparatus controls the duty ratio, in accordance with a fluid pressure of the master cylinder which acts on a discharge port of the pump, the duty ratio decreases as the fluid pressure of the master cylinder decreases.

8. The hydraulic braking apparatus according to claim 7, wherein when the brake fluid is sucked up by the pump through the reservoir port and the amount of the brake fluid in the reservoir chamber decreases to less than the predetermined amount, the valve is changed to be in an open state, the brake fluid flows in the reservoir chamber from the master cylinder through the valve and the brake fluid that has flowed in is sucked up by the pump through the reservoir port.